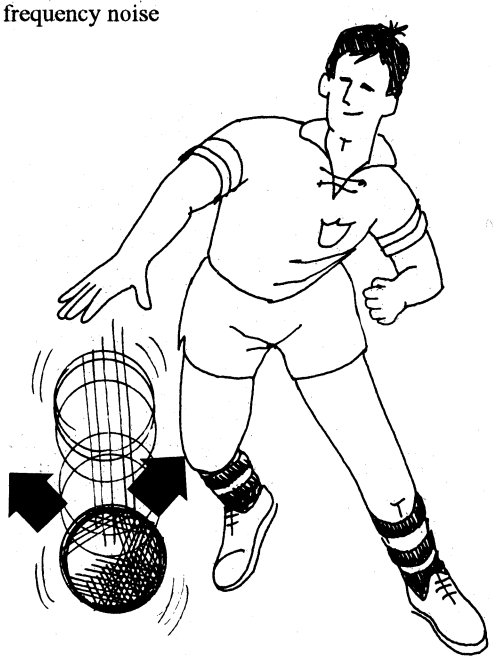
THE RATE OF CHANGE DETERMINES THE AMOUNT OF HIGH FREQUENCY NOISE

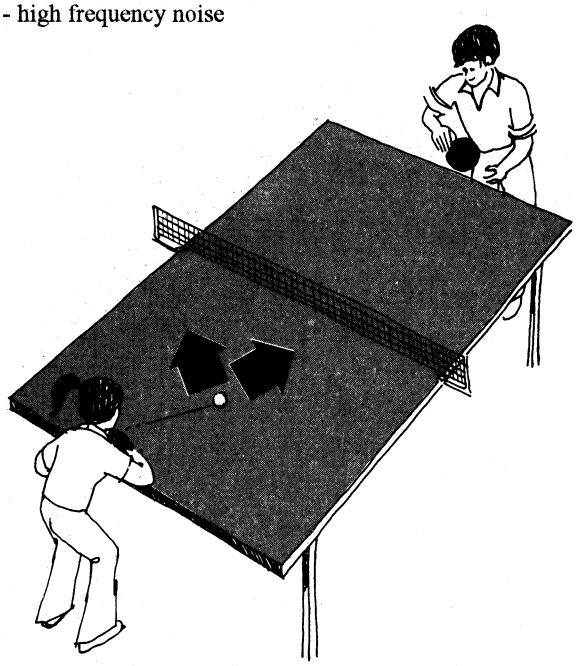
The more rapid the change in force, pressure or speed, the more dominant is the high frequency noise. A very rapid change produces a shorter pulse which has higher dominant frequencies. The rate of change is often determined by the resilience of the two impacting surfaces - the more they deform, the longer they are in contact and the lower the dominant frequencies. When bouncing a basketball on the floor, the ball is in contact with the floor for a relatively long time and the dominant frequency is low. The ping pong ball is in contact with the table for a very short time, and the dominant frequencies are much higher.

Principle

long-lasting impact against floor
- low frequency noise



short impact against table
- high frequency noise



EXAMPLE

With a rough gear design (rectangular teeth), the force on the teeth rises and falls rapidly. Much high frequency noise is generated.

CONTROL MEASURE

With a smooth gear design (rounded teeth), the teeth fit more smoothly together, the force transfer is more continuous and the high frequency noise is reduced. Because the maximum force is reduced when the teeth engage, the sound level is lower at all frequencies than it is with the rectangular tooth design.